

Sleep and the Teenage Brain



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Why the brain needs sleep
Adolescent sleep-wake cycle

It doesn't matter how smart teens are or how well they scored on the SAT or ACT. Good judgment isn't something they can excel in, at least not yet.

➤ For girls, the brain reaches its biggest size around 11 years old. For boys, the brain reaches its biggest size around age 14. But this difference does not mean either boys or girls are smarter than one another

↳ Though the brain may be done growing in size, it does not finish developing and maturing until the mid- to late 20s. The front part of the brain is one of the last brain regions to mature. This area is responsible for skills like planning, prioritizing, and controlling impulses. Because these skills are still developing, teens are more likely to engage in risky behaviors without considering the potential results of their decisions.

➤ Teen brains may be more vulnerable to stress

➤ The rational part of a teen's brain isn't fully developed until age 25 or so.

↳ Recent research has found that adult and teen brains work differently. Adults think with the prefrontal cortex (the brain's rational part). This is the part of the brain that responds to situations with good judgment and an awareness of long-term consequences. Teens process information with the amygdala (the emotional part, associated with emotions, impulses, aggression and instinctive behavior).

↳ In teen's brains, the connections between the emotional part of the brain and the decision-making center develop at different rates

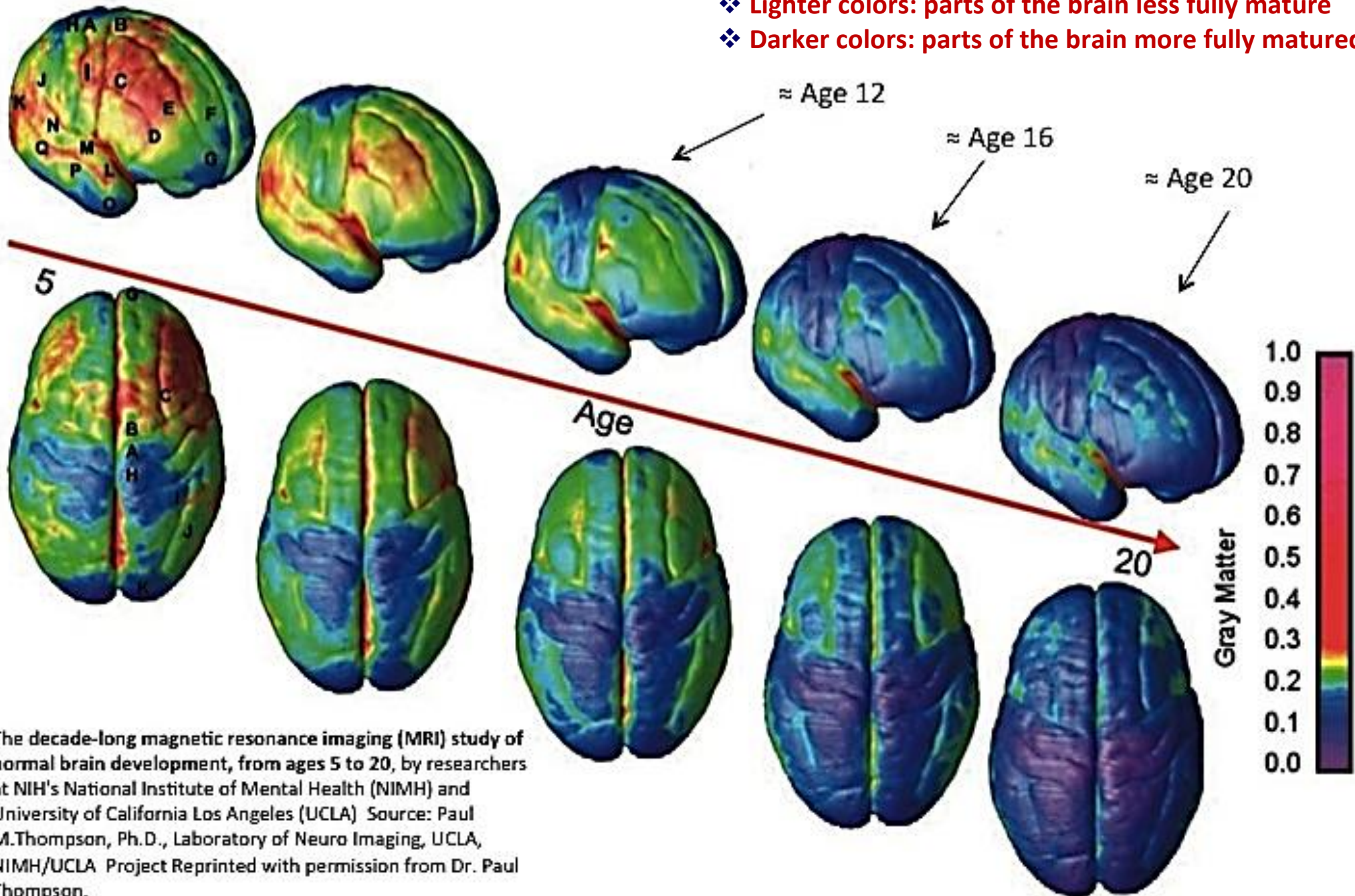
↳ That's why when teens have overwhelming emotional input, they can't explain later what they were thinking. They weren't thinking as much as they were feeling.



Brain Development

Brain Development ages 5 – 20 years old

- ❖ Lighter colors: parts of the brain less fully mature
- ❖ Darker colors: parts of the brain more fully matured



The decade-long magnetic resonance imaging (MRI) study of normal brain development, from ages 5 to 20, by researchers at NIH's National Institute of Mental Health (NIMH) and University of California Los Angeles (UCLA) Source: Paul M.Thompson, Ph.D., Laboratory of Neuro Imaging, UCLA, NIMH/UCLA Project Reprinted with permission from Dr. Paul Thompson.

Adolescence (in terms of brain age) is not completed until the mid-20s, near 25 years old

Sleep

Why did the brain need sleep?

- To process the day's events and exposure to knowledge.
 - ↳ When we sleep, the brain continues to process the input from the day and make sense of it.
 - ↳ For instance, in a math concept you learned Monday was difficult and you see uncertain, brain scans have revealed that while you sleep the area of the brain involved with math is active, and in the morning what was difficult on Monday seems easier to understand on Tuesday.
- Detoxification
 - ↳ When you sleep, the upper spinal cord releases a fluid which serves to “flush out” toxic waste products which cells produce with daily use, effectively cleaning out the brain. It removes inflammatory, toxins and protein plaque buildup (associated with Alzheimer's); the waste is flushed out into the bloodstream, through which it is eventually carried to the liver for detoxification
 - ❖ Discredited theory: It used to be thought that sleep helps animals conserve energy by forcing a period of rest. But this theory is deemed unlikely since the sleeping brain uses up almost as much energy as the awake brain.

What does recent research reveal?

- A stress hormone slightly “awakens” our brain 100 times a night normally (we have no memory of this shifting between light- and deep-sleep). Imagine what sleep is like for someone with a stressful life!



Sleep and the Teenage Brain



Sleep affects

- Mood
- Grades and schoolwork
- Concentration
- Relationships
- Physical health

And mental health

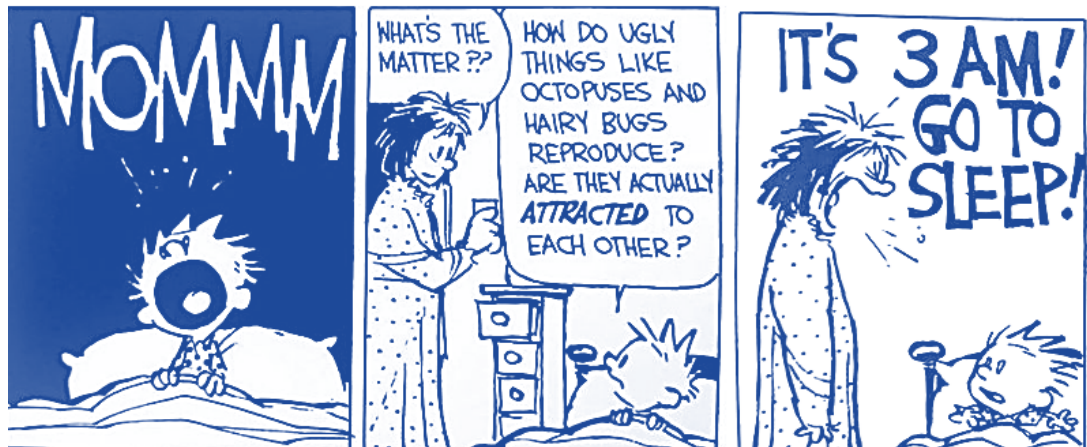
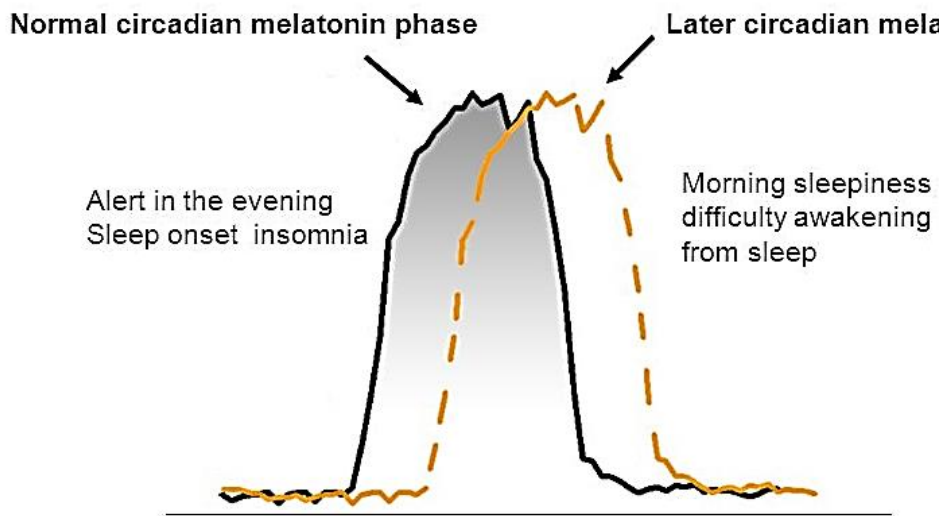
Teens need more sleep than children and adults

Research shows that melatonin (the “sleep hormone”) levels in the blood are naturally higher later at night and drop later in the morning in teens than in most children and adults.

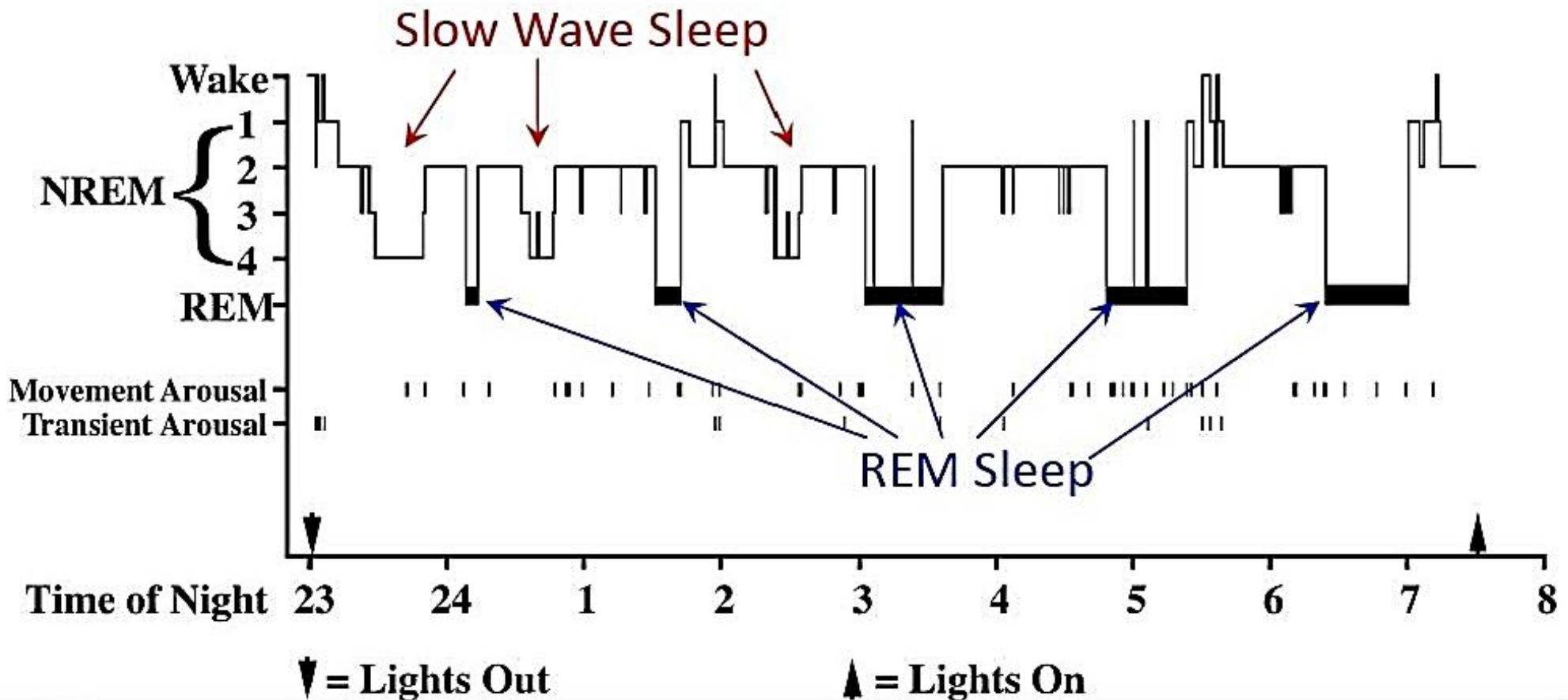
- ↳ This difference may explain why many teens stay up late and struggle with getting up in the morning. Teens should get about 9 - 10 hours of sleep each night, but most teens do not get enough sleep.
- ↳ Less than six hours sleep will NEGATE (undo) any exercise benefit conferred on the brain, regardless of age!

Adolescent Sleep-Wake Cycle

Children and adult: “Normal” (black) phase
 Teenager: “Later” (gold) phase



CYCLE OF SLEEP IN A NORMAL TEENAGER



ADOLESCENT SLEEP, HEALTH,
AND SCHOOL START TIMES
THE NATIONAL CONFERENCE

- REM starts 70-90 minutes after going to sleep.
 - ↳ REM helps to regulate mood, is good for overall health and learning
 - ↳ Computers and phones release blue light, which suppresses the hormone which makes us feel drowsy.
- Lack of REM...
 - ↳ Increases risk of obesity, disease, immune function decreased, declining overall health, acne. It slows learning, inhibit creativity and impair memory. Leads to mood swings, irritability, and makes

TIPS FOR HEALTHY SLEEP

✗ NO



HEAVY FOOD



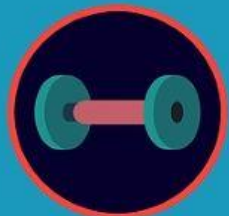
BLUE LIGHT



ALCOHOL, SMOKING



CAFFEINE



HARD TRAINING



STRESS



✓ YES



GET UP AT THE SAME TIME



EVENING WALKS



COMFORTABLE BED



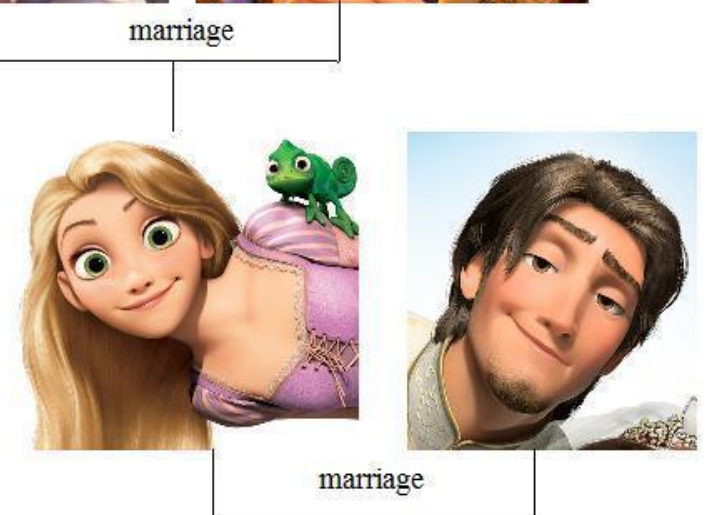
COOL AND DARK ROOM



BEDTIME ROUTINE



RELAXING BATH



dating/marriage?

marriage